Section 702. MORTAR AND GROUT

702.01 Description. Mortars and grouts consist of a mixture of cement, fine aggregate (except for expansive grout), concrete admixtures when specified, and water, proportioned as required. Stiff mixtures are classified as mortars. Fluid mixtures are classified as grouts.

702.02 Materials. Materials shall meet the following requirements.

Mortars and grouts may be remixed but shall not be retempered or used after they have begun to set.

Mortars and grouts shall only be used when the materials being mortared or grouted are at a temperature of 40 °F or higher and will remain so for the duration of the required curing period.

A. **Standard Mortars and Grouts.** The cement and fine aggregates shall be proportioned by weight for batches of one cubic yard or more, and by weight or volume for smaller batches, as indicated in Table 702-1 for the type mortar or grout specified. Water shall be added in amounts necessary to obtain a mortar or grout of the consistency required for the work.

B. **Non-shrinking Mortar and Grout, Type H-1 (Non-metallic).** This material is used for filling the post-tensioning stress pocket in fascia beam of prestressed box beams, under leveling plates supporting structures and for grouting dowels. Type H-1 mortar and grout shall be selected from the Qualified Products List.

C. **Expansive Grout, Type E-1.** This material is used for filling the void around post-tensioned tendons in precast concrete box beams. The grout shall be proportioned as follows: 94 pounds Type I Portland cement; 5 gallons water (max); expansive admixture as recommended by the manufacturer.

   No sand shall be used in the grout mixture. The grout shall attain a 28-day minimum compressive strength of 3000 psi, determined according to ASTM C 942, except the grout shall be proportioned as called for in these specifications.

   The expansive admixture, including any plasticizing or water-reducing agent, shall not contain chloride ions in excess of 0.50 percent by weight of the admixture, nor any fluorides, sulfides, nitrates, or thixotropic additives. The admixture may be in liquid or solid form. Aluminum powder of the proper fineness and quantity, or other approved gas-evolving material that is well dispersed throughout the admixture, shall be used. The grout shall have an unrestrained expansion of 5 to 10 percent determined according to ASTM C 940, except that the grout shall be proportioned as called for in these specifications and the expansion shall be determined at 3 hours.

Table 702-1 Proportioning Standard Mortars and Grouts

Mortar or Grout Type	General Usage	Materials				Mix Proportions by Dry Weight pounds per cubic yard					Mix Proportions by Bulk Volume, Parts			
		Portland Cement	Masonry Cement	Hydrated Lime	Fine Aggregate	Portland Cement	Masonry Cement	Hydrated Lime	Fine Aggregate	Net Water Approx.	Portland Cement	Masonry Cement	Hydrated Lime	Fine Aggregate
R-1 (Grout)	Bond or Primer Coat	Type I,IA	---	—	2NS	1175	---	—	964	705	1	---	---	1
R-2 (Mortar) (a)	Patching Spalls; Filling Space Between Box Beams; Piling (c)	---	Type M	---	2MS	---	930	---	2137	415	---	1	---	2-1/2
		Type I	Type N	---	2MS	468	349	---	1991	415	(b)	(b)	---	(b)
		Type I,IA	---	Type S,SA	2MS	828	---	75	2016	415	(b)	---	(b)	(b)
		Type I,IA	---	—	2MS,2NS	930	---	---	1966	415	1	---	---	2-1/2
R-3 (Mortar) (a)	Setting Precast Concrete Barriers; Filler Between Slope Protection Blocks and Riprap	Type I,IA	---	---	2NS	765	---	---	2266	353	1	—	—	3-1/2

a. All mortars shall have an entrained air content of 14 ± 4 percent by using masonry cement, Type IA Portland cement, Type SA lime, or an air-entraining admixture. Masonry cement and Type IA Portland cement, or Type IA Portland cement and Type SA lime, shall not be combined, unless tests indicate the air content is within acceptable limits.

b. Proportioning by volume will not be permitted when blending cementitious materials (Portland cement, masonry cement, or lime).

c. Mortar for placing in the bottom of piling shall contain Portland cement as the only cementitious material.